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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,638	12/16/2003	Cheng Siew Tay	P-6121-US	3526
49444	7590	02/22/2006	EXAMINER	
PEARL COHEN ZEDEK LATZER, LLP 1500 BROADWAY, 12TH FLOOR NEW YORK, NY 10036			NGUYEN, HUNG THANH	
			ART UNIT	PAPER NUMBER
			2841	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/735,638

Applicant(s)

TAY ET AL.

Examiner

HUNG T. NGUYEN

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 21-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-20 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_



## DETAILED ACTION

### *Election/Restrictions*

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-20 drawn to the printed circuit board, classified in class 174, subclass 260.
- II. Claims 21-26, drawn to an apparatus, classified in class 361, subclass 779.
- III. Claims 27-32, drawn to a method, classified in class 29, subclass 800+.
- IV. Claims 33-38, drawn to a subcombination, classified in class 174, subclass 261.

The inventions are distinct, each from the other because of the following reasons:

Inventions III, IV and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case an apparatus can be used to make a different device such as audio input device.

Inventions III and I, II, IV are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process

(MPEP § 806.05(f)). In the instant case method of making can be provided to make different types of circuit boards for different applications.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Caleb Pollack on 1/30/06 a provisional election was made with traverse to prosecute the invention of group I, claims 1-20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-38 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### ***Claim Rejections - 35 USC § 102***

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 9-10, 16, 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Asai et al. (US 6,831,234).

**Regard claim 1:** Asai et al. discloses in figures 4A-5B, a printed circuit board comprising: pads (8) suitable to be soldered to respective solder-balls (11) of a device, where a perimeter (outer of pad 8) of a pad (8) has a crack initiation point (teeth under layer 8) at a location where cracks in a solder-ball are anticipated to start after said solder-ball is soldered to said pad (8), and where said pad (8) merges with a trace (10)

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along a portion of said perimeter (outer of pad 8) that does not include a vicinity of said crack initiation point (teeth under layer 8).

**Regard claim 2, 9, 16, 19:** Asai et al. discloses in figures 4A-5B, the printed circuit board wherein at least one of said pads (explain in claim 1) is a metal (see column 6, lines 58-65)-defined pad.

**Regard claim 3, 10:** Asai et al. discloses in figures 4A-5B, the printed circuit board wherein at least one of said pads (explain in claim 1) is a solder-mask (8 can be used as solder mask)-defined pad.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 6-8, 11-15, 17-18, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asai et al. (US 6,831,234) in view of Asai et al. (US 6,487,088).

**Regard claim 4, 11:** Asai et al. (US 6,831,234) discloses all element of the printed circuit board as described above with respect to claim 1 except, Asai et al. does not disclose at least one of said is substantially round

Asai et al. (US 6,487,088) discloses least one of said is substantially round (675D)

Therefore, it would have been obvious for one ordinary skill in the art at the time of the invention to make pad with round shape for the benefit of easier to identify between signal and power pad.

**Regard claim 6, 7, 13:** Asai et al. (US 6,487,088) discloses in figure 24B, the printed circuit board wherein the pad is substantially round (explain above) and a normal (it appears normal is in parallel, see figure 24B) to said perimeter at a middle point of said portion is substantially parallel to a crack propagation direction for said solder-ball.

**Regard claim 8:** Asai et al. (US 6,487,088) discloses in figure 1, a printed circuit board comprising: pads (75U) suitable to be soldered to respective solder-balls of a device, said pads (75U) having microvias (the center of pad 75U) located therein, where a center of a microvia (the center of pad 75U) of a pad (75U) is farther than a center of said pad from a crack initiation point (teeth on 72) located on a perimeter (outer of pad 75U) of said pad (75U) at a location where cracks in a solder-ball are anticipated to start after said solder-ball is soldered to said pad.

**Regard claim 12, 14:** Asai et al. (US 6,487,088) discloses in figure 1, the printed circuit board wherein at least one point of the perimeter of said microvia (it appears microvia is located on perimeter of the pad, see figure 1) is located on the perimeter of said pad.

**Regard claim 15, 18:** Asai et al. (US 6,487,088) discloses in figure 1, the printed circuit board having a device installed thereon, the printed circuit board comprising: pads (75U) soldered to respective solder-balls of said device, said pads (75U) having microvias (the center of pad 75U) located therein, where a center of a microvia (center of 75U) of a pad (75U) is farther (it appears center of 75U is farther then center of layers

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below 75U) than a center of said pad from a crack initiation point located on a perimeter of said pad at a location where cracks in a solder-ball are anticipated to start after said solder- ball is soldered to said pad (75U).

Asai et al. does not disclose the printed circuit board has a voltage monitor installed thereon.

However, it is old and well known for one ordinary skill in the art to build a simple diode circuit to function as a voltage monitor to detect the forward/reverse current with LED on/off mode.

Therefore, it would have been obvious for one ordinary skill in the art at the time of the invention to have a voltage monitor on the printed circuit board for the benefit of detecting voltage.

**Regard claim 17, 20:** Asai et al. (US 6,487,088) discloses all element of the printed circuit board as described above with respect to claim 15 except, Asai et al. does not disclose the printed circuit board is a mother board.

However, it is old and well known for one ordinary skill in the art to have via, microvia on mother board

Therefore, it would have been obvious for one ordinary skill in the art at the time of the invention to make motherboard to have via and micro via for the benefit of assembly components.

***Allowable Subject Matter***

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Claim 5 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

**Regard claim 5:** Asai et al. discloses all elements of the printed circuit board as described above with respect to claim 1 except, Asai et al. does not disclose the portion is not longer than the length of one quarter of the perimeter.

Therefore, it would be no motivation to make this modification.

### **Relevant Art**

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The Yasue et al. (US 6,010,768) teaches the multilayer of printed circuit board, Inagaki et al. (US 6,724,638) teaches the printed circuit board, Wang et al. teaches the technique of bonding layers, Shirai et al. (US 6,365,843) teaches the multi-layers with via, Enomoto et al. (US 5,589,255) teaches the adhesive plating for circuit board.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG T. NGUYEN whose telephone number is 571-272-5983. The examiner can normally be reached on 8:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, KAMMIE CUNEO can be reached on 571-272-1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



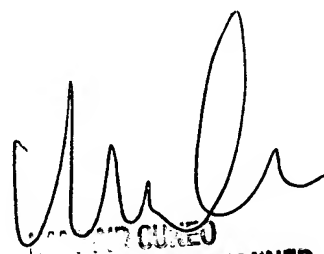
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HUNG THANH NGUYEN

2/9/06

HN



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